



*HMA Construction Program*

# HMA Delivery



# Learning Objectives

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1. State the objective of HMA delivery
2. Discuss key issues related to haul trucks
3. Describe proper truck operation (loading and unloading) techniques
4. Describe segregation



# HMA Delivery

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- What is the objective?



- Truck drivers are a key component,...  
Make them a part of the team!



# Key Issues Related to Haul Trucks

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- Types and characteristics of haul trucks
- Methods of heat insulation
- Cleaning
- Truck maintenance



# *Three Basic Types of Haul Trucks*

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- End dump
- Belly (bottom) dump
- Horizontal discharge

# *End Dump Trucks*



Standard

Semi-trailer





# *Standard End Dump Truck*

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- Capacity: 11-18 Mg (12-20 tons)
- 3 to 6 axles
- Advantage: Maneuverability
- Disadvantage: Limited capacity



# *Semi-trailer End Dump Truck*

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- Capacity: 18-23 Mg (20-25 tons)
- 5 to 6 axles
- Advantage: Capacity
- Disadvantages:
  - Overhead clearance
  - Poor maneuverability
  - Increased segregation
  - Potential conflicts with paver





# *Double Trailer Combinations*



# *Belly Dump Truck*





# *Belly Dump Truck*

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- Capacity: 18-23 Mg (20-25 tons)
- Advantages:
  - Capacity
  - No contact with paver
- Disadvantages:
  - Requires attention to sizing the windrow
  - Need for windrow elevator
  - Potential for aggregate segregation



# *Horizontal Discharge Truck*



# *Horizontal Discharge Conveyor*







# *Horizontal Discharge Truck*

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- Capacity: 18-45 Mg (20-50 tons)
- 5+ axles
- Advantages
  - Capacity
  - Limited segregation during unloading
- Disadvantages
  - Poor maneuverability
  - Availability

# *Tarp for (Some) Protection Against Heat Loss and Inclement Weather*



Are there any  
potential problems  
with this tarp  
configuration?

# *Side Insulation*





# *Keep Truck Bed Clean*



# *Use Only Approved Release Agents*





# *Keep Outside of Bed Clean Too*





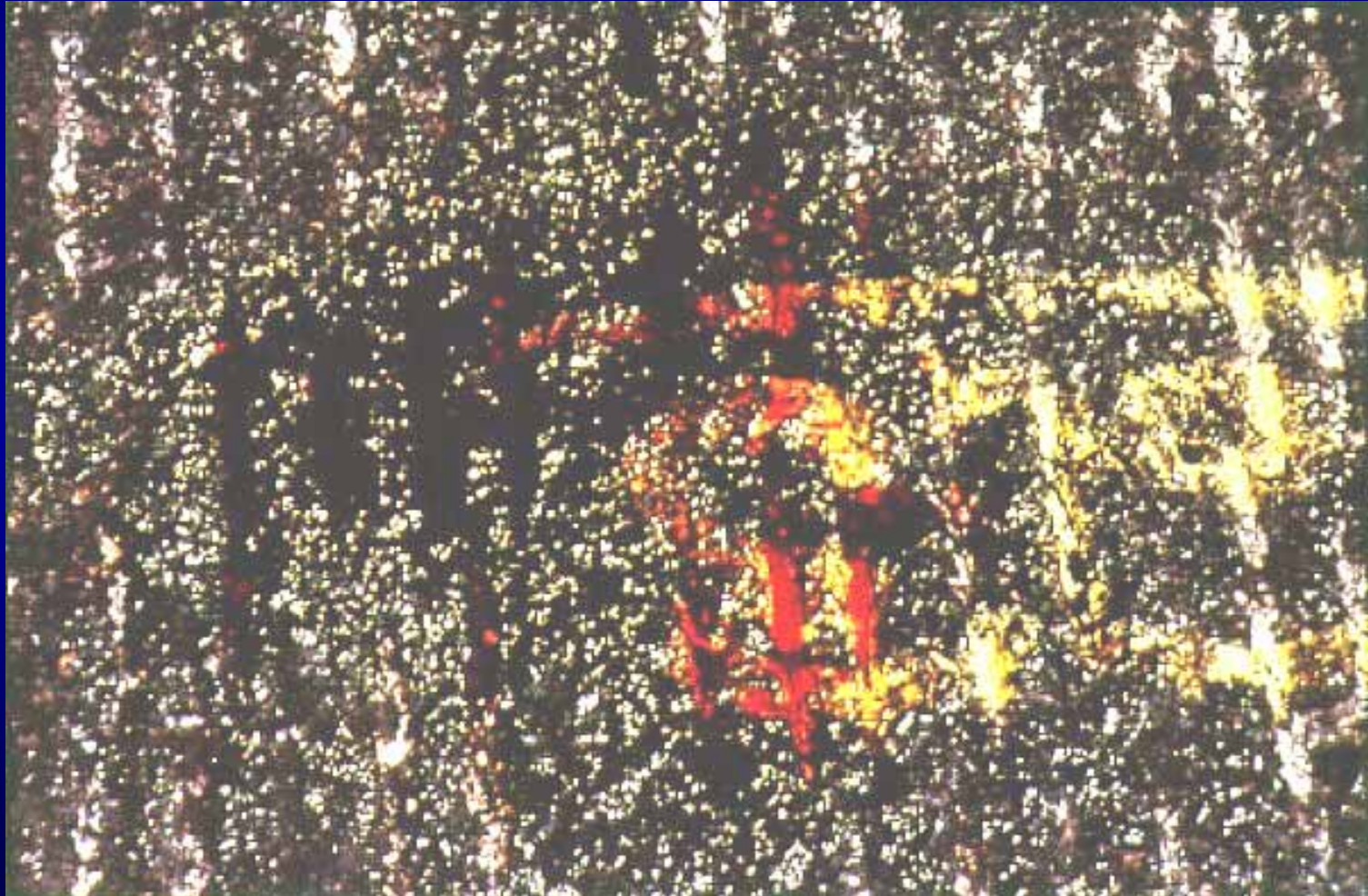
# *Haul Vehicle Maintenance*

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- Engine
- Drive Train
- Hydraulic System
- Brakes
- Lights



*What problem does this hydraulic fluid leak create?*



# *Acceptable Truck Bed?*





# Truck Loading Practices

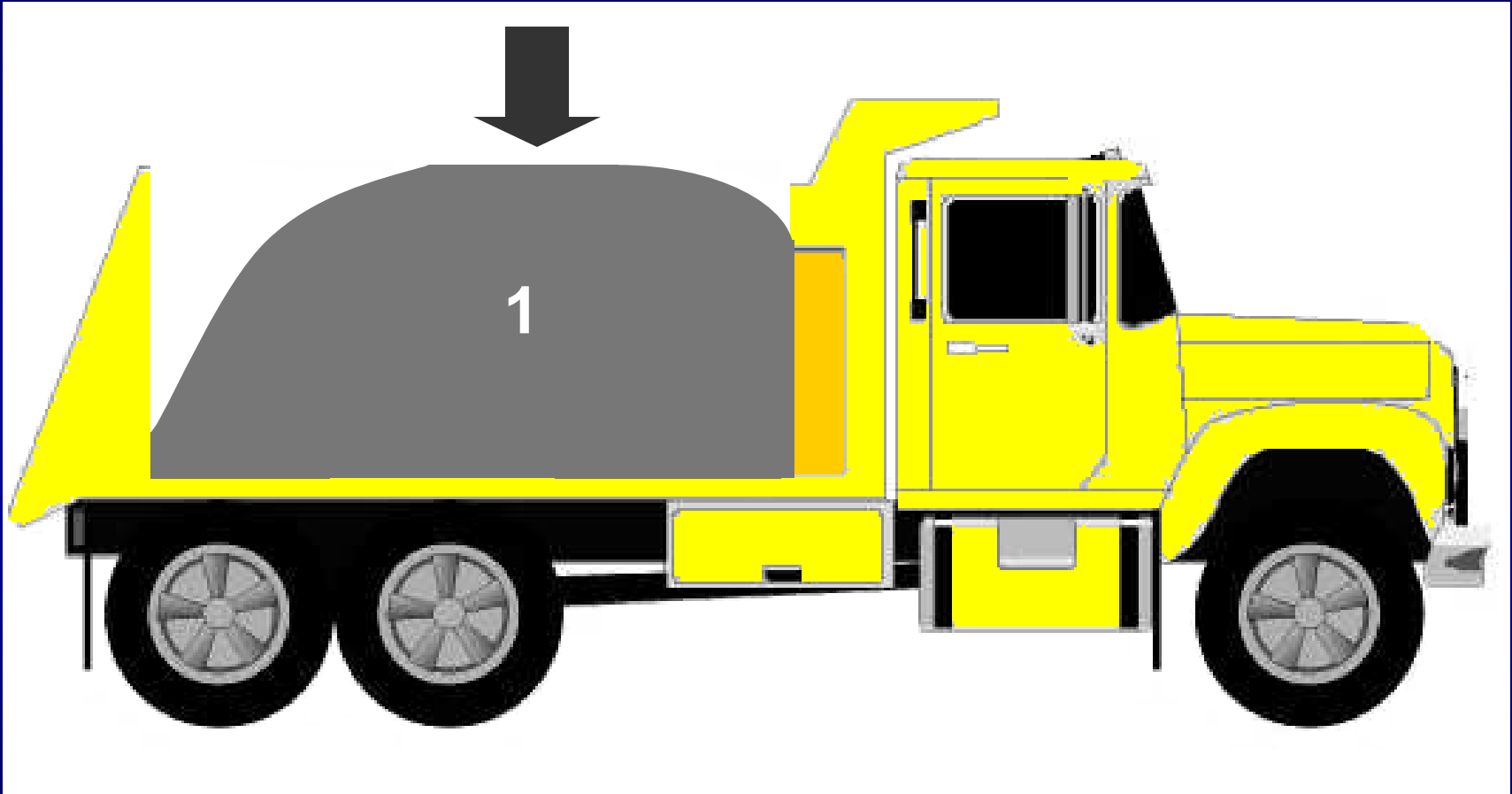


*Must Avoid Segregation!*





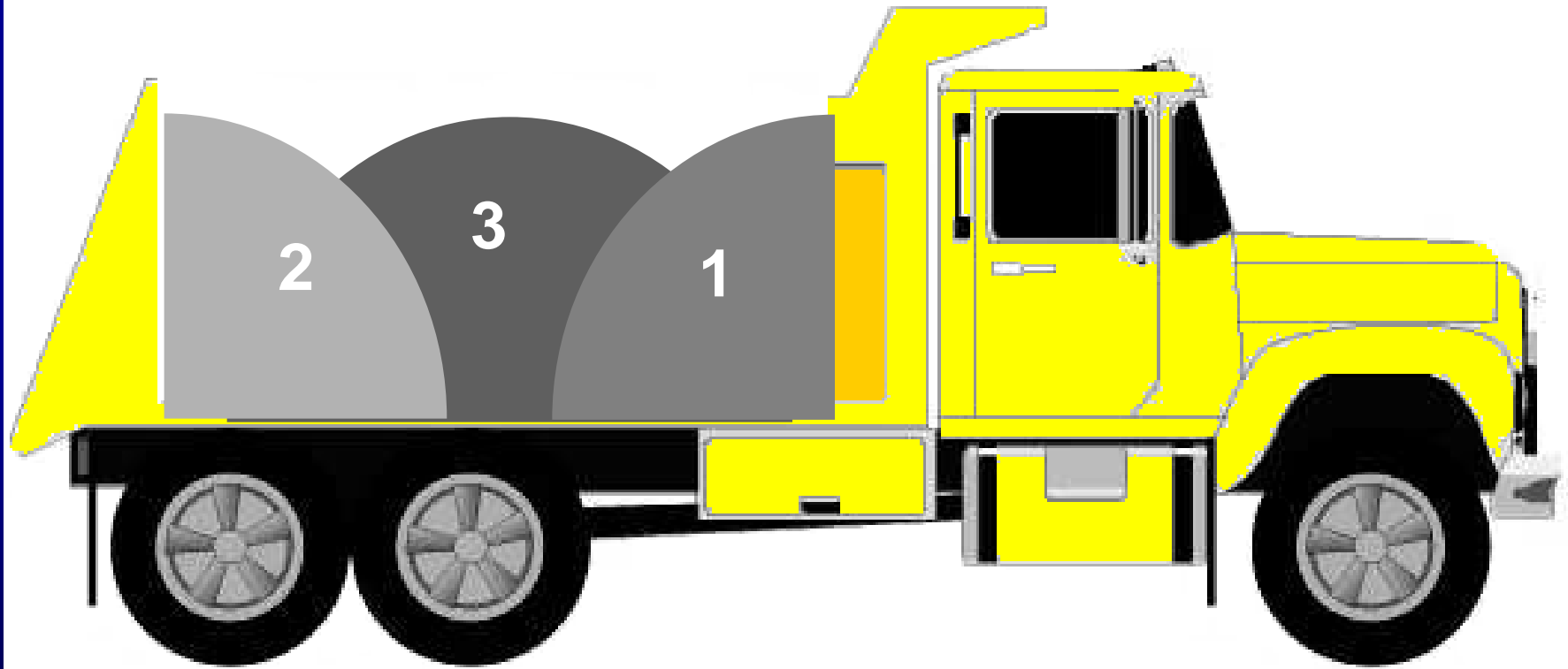
# *Typical Loading Practice*



Not recommended for segregation-prone mixes!

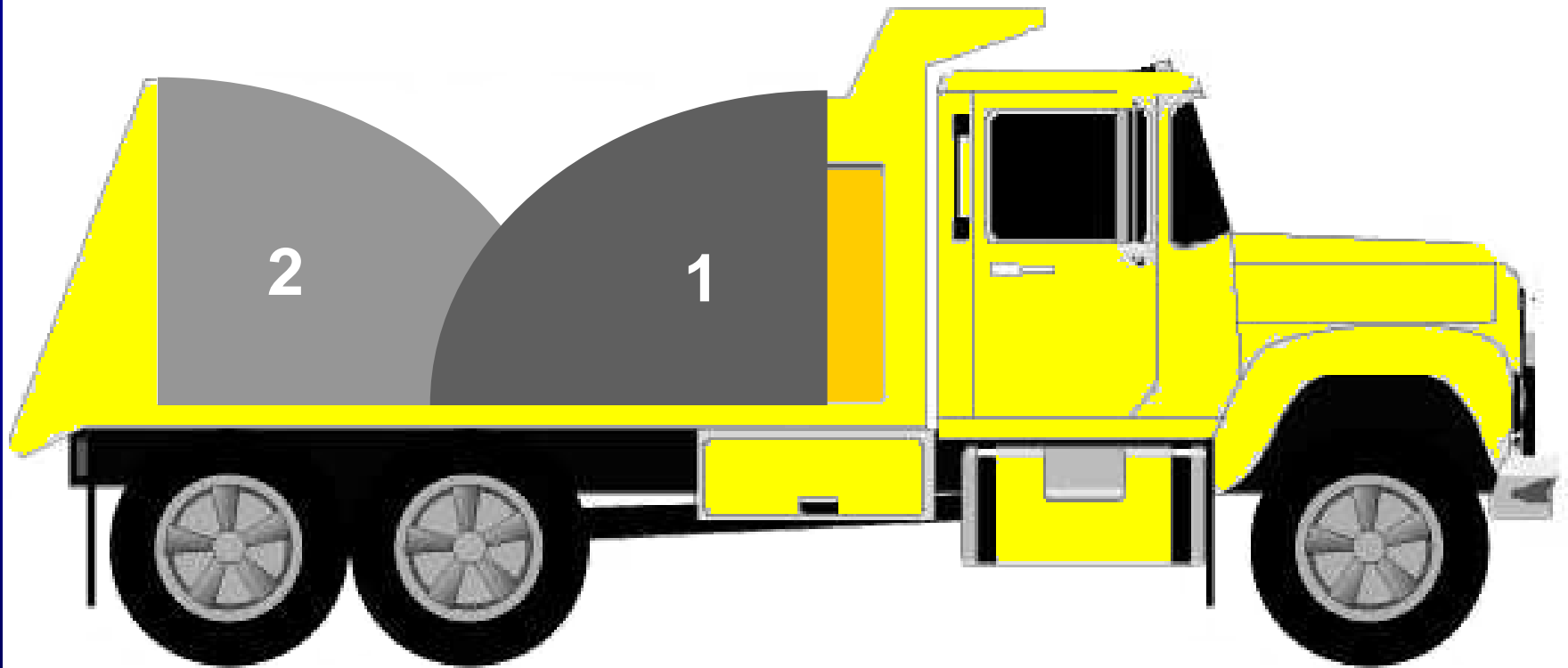


# *Sequence for Longer End Dump Trucks*

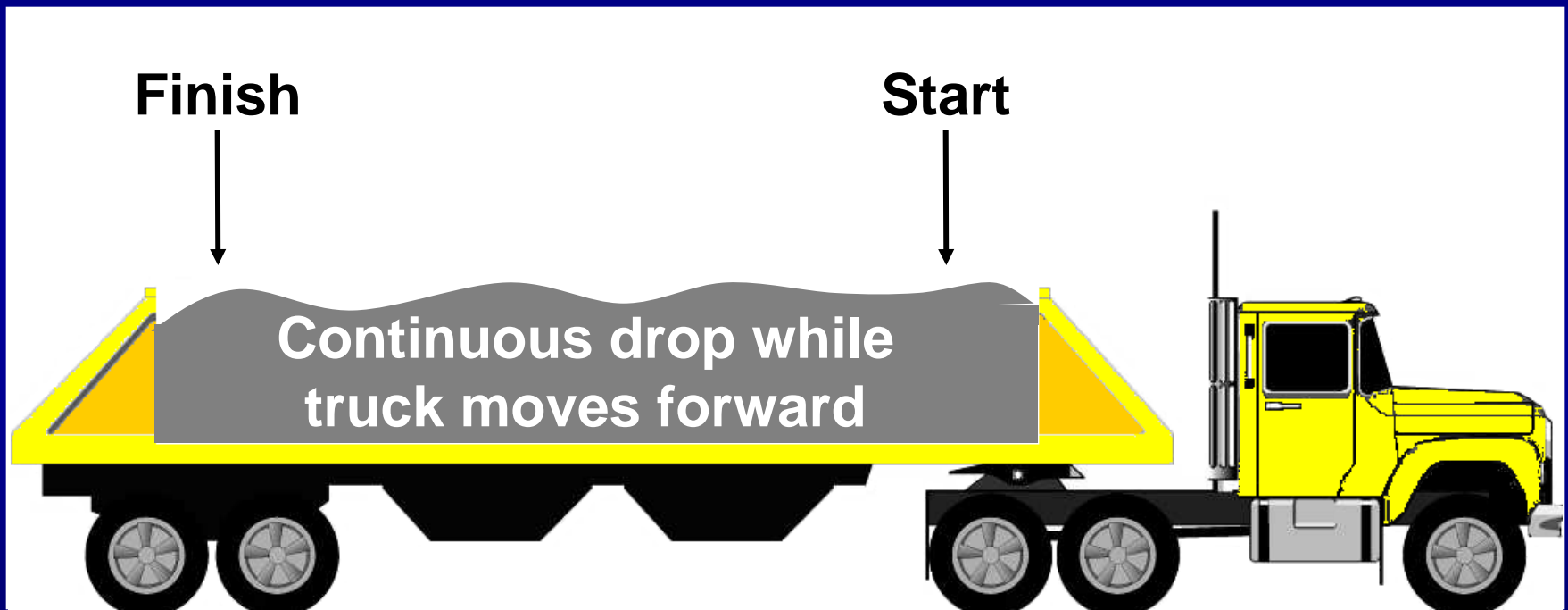




# *Sequence for Shorter End Dump Trucks*



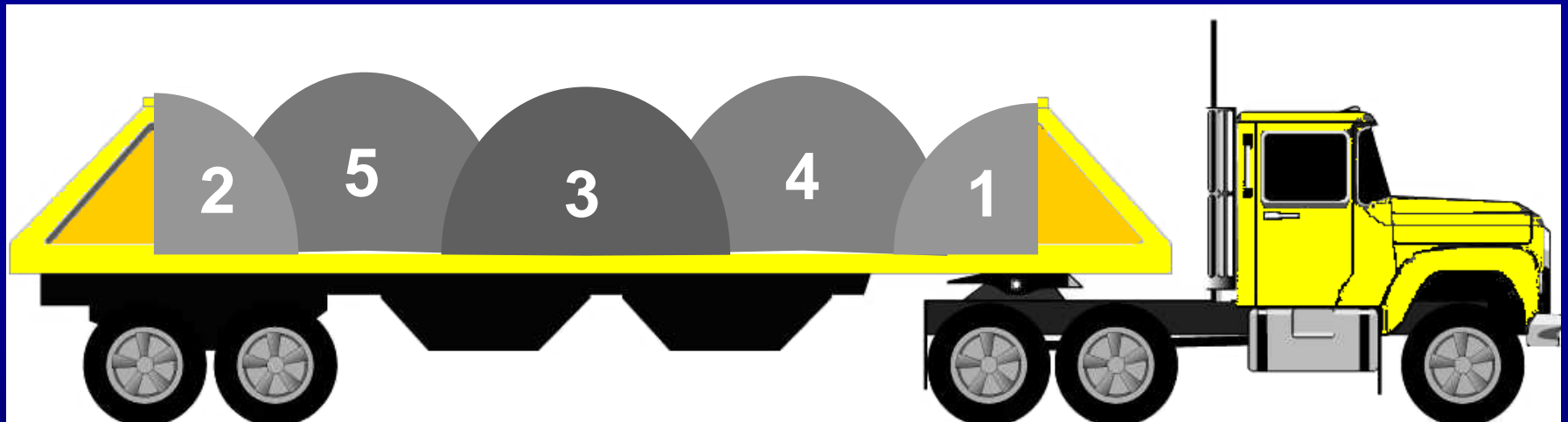
# *Typical Loading Practice for the Belly Dump Trucks*



Not recommended for segregation-prone mixes!



# *Preferred Method for Segregation Prone Mixes*





# *Other Loading Practices to Avoid*

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- Topping off
- Overloading



# Truck Operation (Unloading)

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- General recommendations associated with all truck types
- Specific methods for:
  - End dump trucks
  - Belly dump trucks



# *General Recommendations*

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- Trucks should wait in designated areas and avoid tracking of tack coat
- Coordinate truck schedule to assure timely arrivals with minimum wait time
- Maintain good communications with plant operators and truck drivers
- Check weigh tickets upon arrival to site



# *End Dump Truck Operation*



Positioning in front of paver

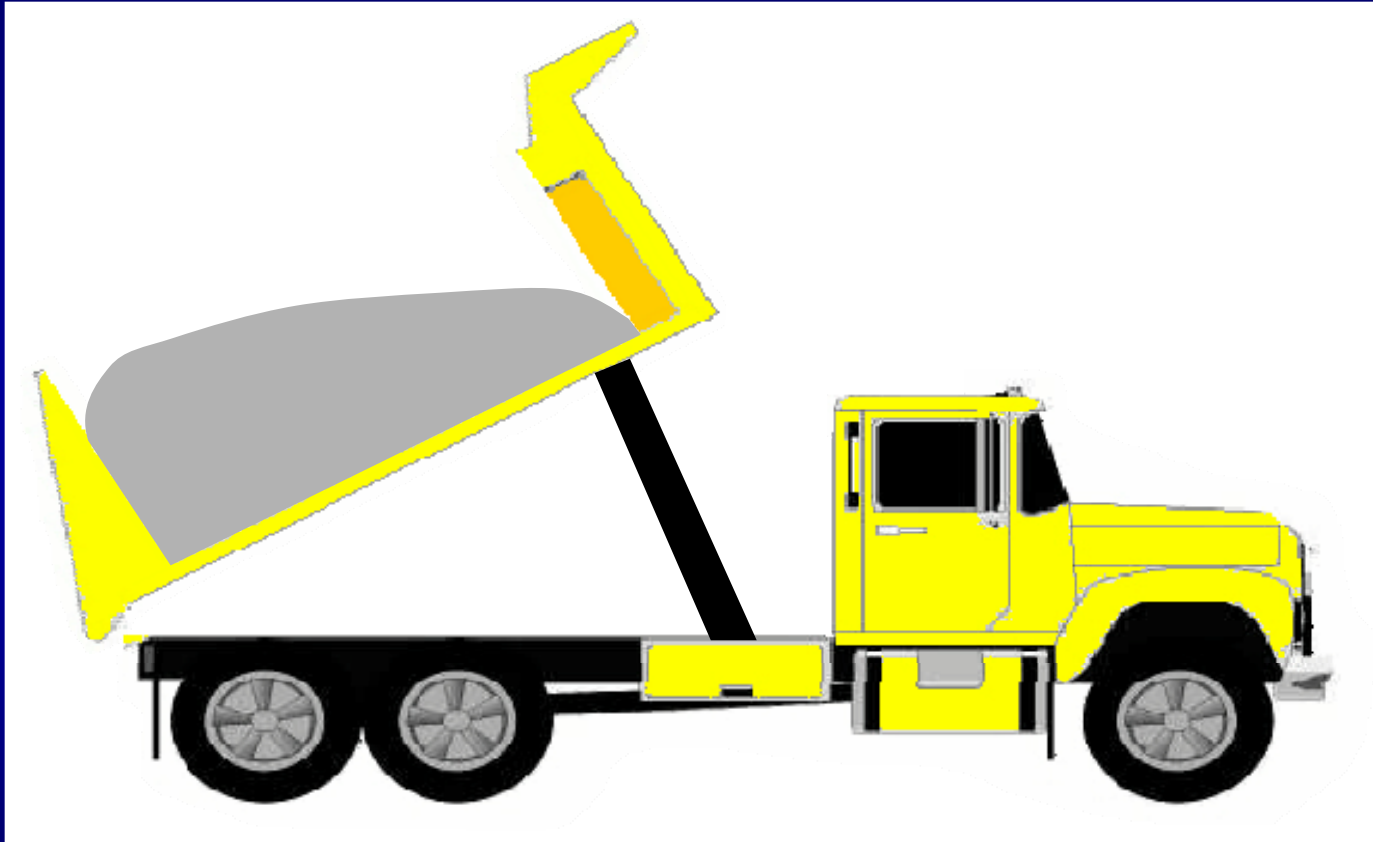
# *End Dump Truck Operation*



First contact with paver,... avoid bump!



# *End Dump Truck Operation*



Raise bed, but keep tailgate closed  
until mix slides against it



# *End Dump Truck Operation*



Open gate and continue to raise bed



# *End Dump Truck Operation*

Empty mix in  
one smooth,  
continuous  
discharge



What  
are  
baffles  
for?

# *End Dump Truck Operation*



Lower bed before pulling away



# *End Dump Truck Operation*



Move out and make room

# *End Dump Truck Operation*



Proceed to the designated clean-up area





# *End Dump Truck Operation*



# *End Dump Truck Operation*



What happened here?

# *End Dump Truck Operation*



Problem with pulling away with bed up



# *End Dump Truck Operation*



What probably caused this?

# *End Dump Truck Operation*



Why can't this be paved over?





# *Belly Dump Truck Operation*



Mix is deposited in the form of a windrow

# *Belly Dump Truck Operation*



Windrow elevator for pickup and charging



# Types of Segregation (and Treatment Considerations)

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- Coarse/Fine Aggregate
- Thermal





# *Aggregate Segregation*

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- Problem – Mix segregation results in non-uniform gradation and density, interconnected air voids, and poor mix performance
- Typical sources:
  - Mix loading
  - Mix unloading
  - Paver operation



# *Minimize Aggregate Segregation by:*

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- Better mix gradations
- Improved loading, unloading and paving practices
- Special equipment – Material Transfer Vehicle (MTV)

# *Material Transfer Vehicle*



Truck dumps into MTV (rather than paver)



# *Material Transfer Vehicle*

MTV conveys mix  
into surge bin  
inserted into  
paver hopper







# *Thermal Segregation*

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- Problem – Non-uniform temperature distribution makes it difficult to achieve uniform compaction and maximum HMA performance
- Typical sources:
  - Time duration between loading and paving
  - Processes that increase mix exposure to non-uniform cooling



# *Thermal Segregation Can Be Reduced by:*

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- Minimizing time between truck loading and placement
- Use of truck insulation
- Proper paving techniques
- Special equipment – Material Transfer Vehicle (MTV)



# *Thermal Segregation As Depicted by Infrared Photos*

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1. End dump truck directly into paver
2. Blaw-Knox MC-30 MTV
  - a) With mixing
  - b) Without mixing
3. Cedarapids MS-3 MTV
4. Roadtec Shuttle Buggy
5. Belly dump truck with windrow elevator

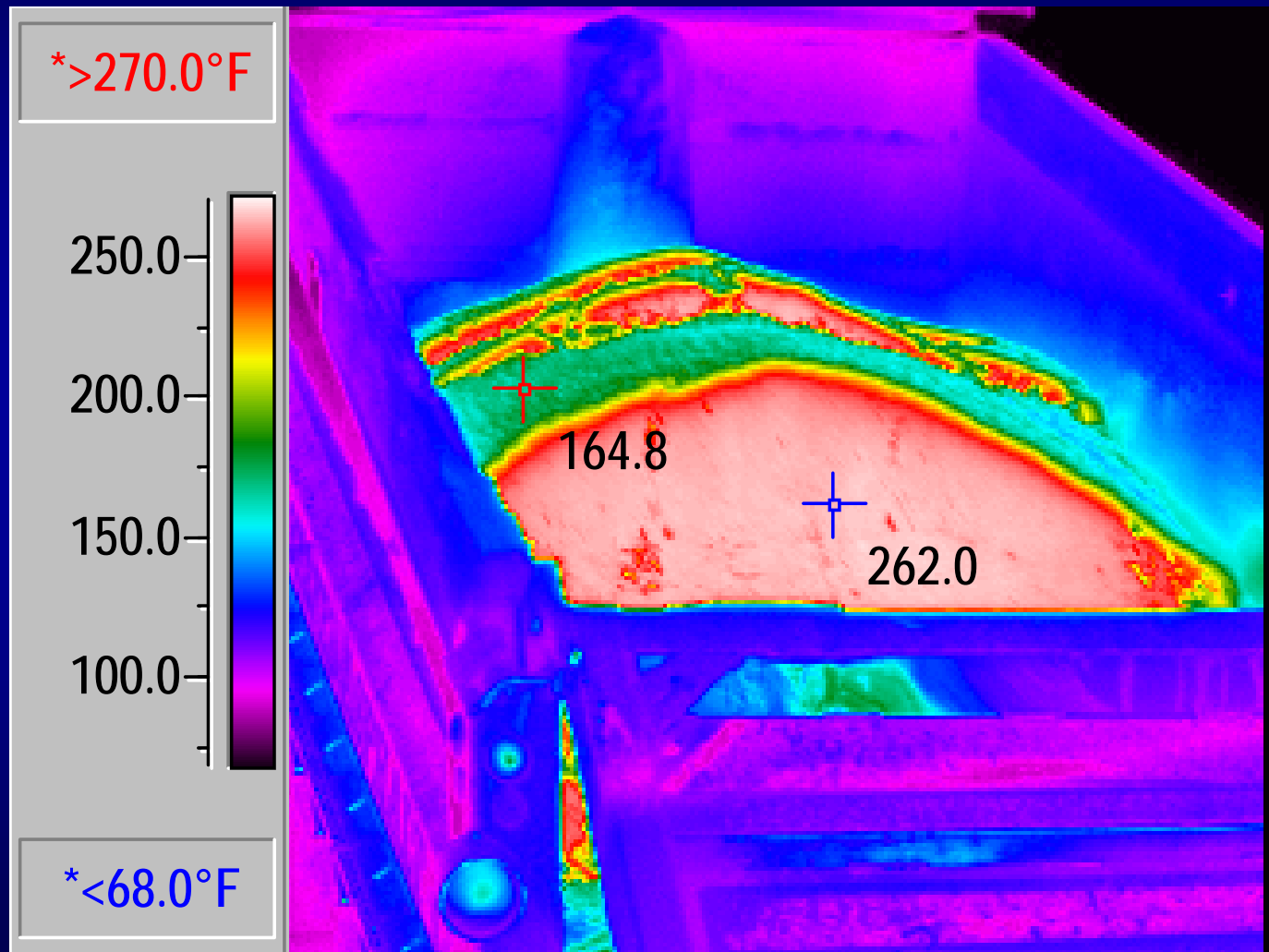
# *1. End Dump Directly Into Paver*







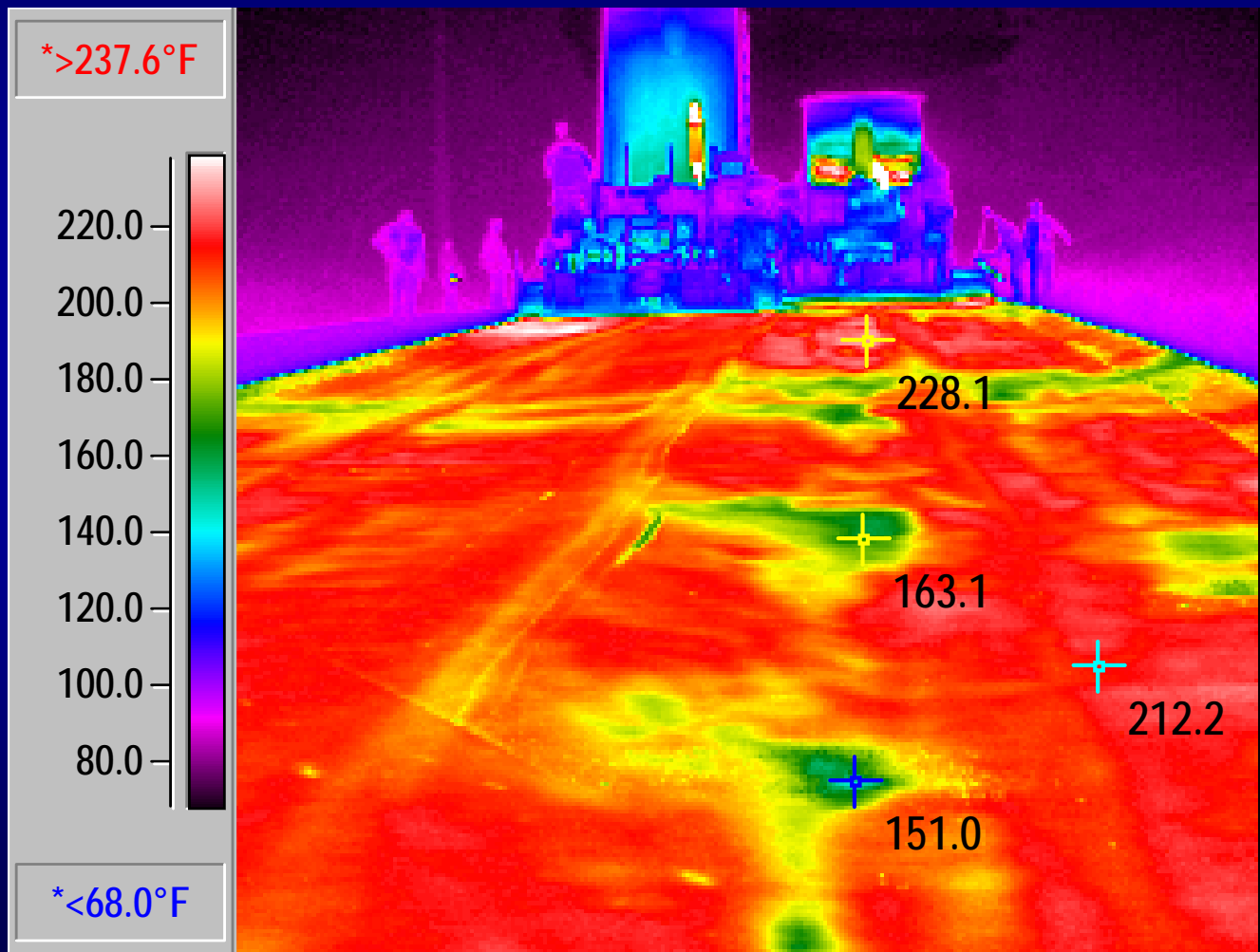
# *Infrared Photo of End Dump*





# *Infrared Photo*

## *(End Dump Mix Behind Paver)*



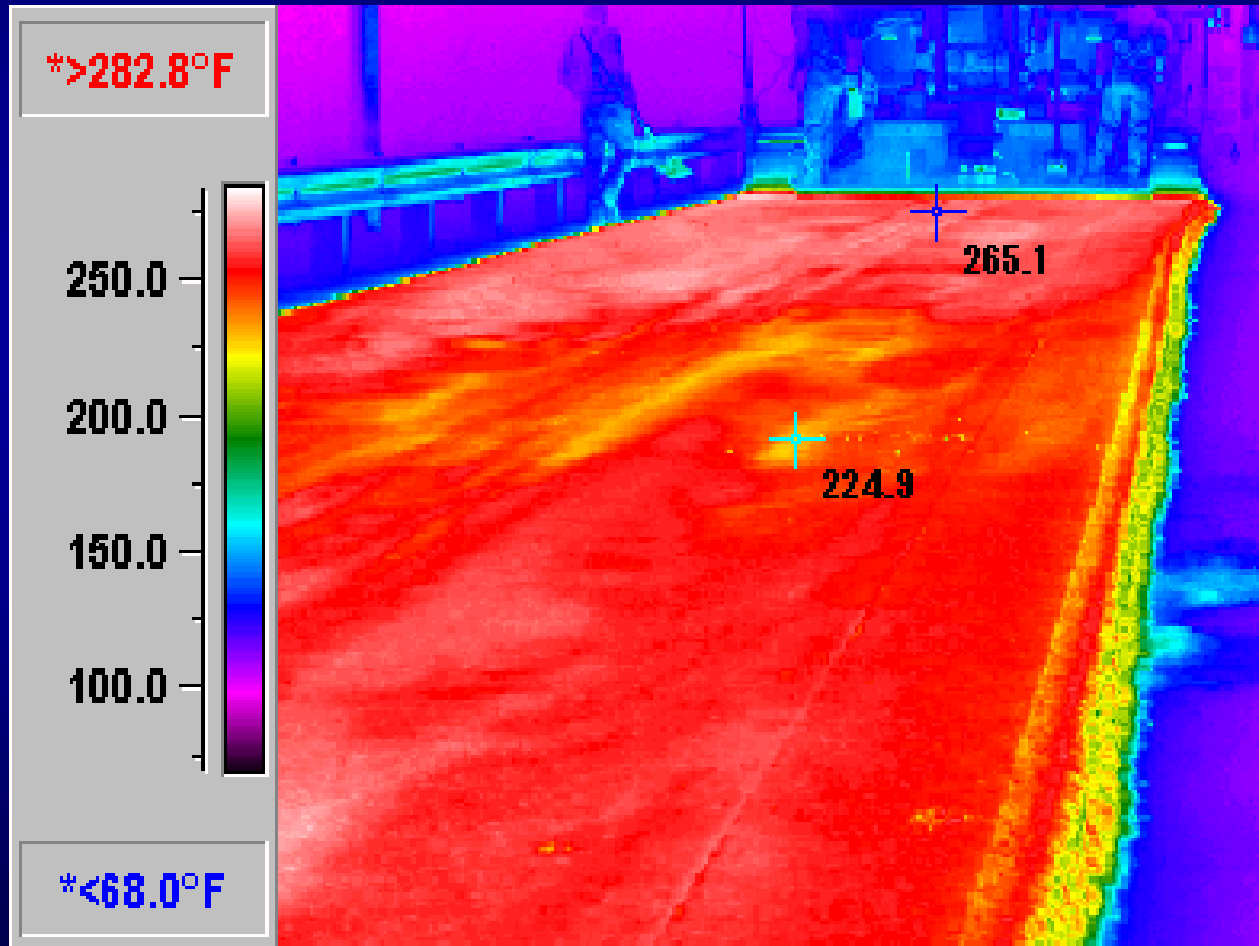
## *2. Blaw-Knox MC-30 MTV*





# *Infrared Photo*

## *(Blaw Knox MTV with Mixing)*

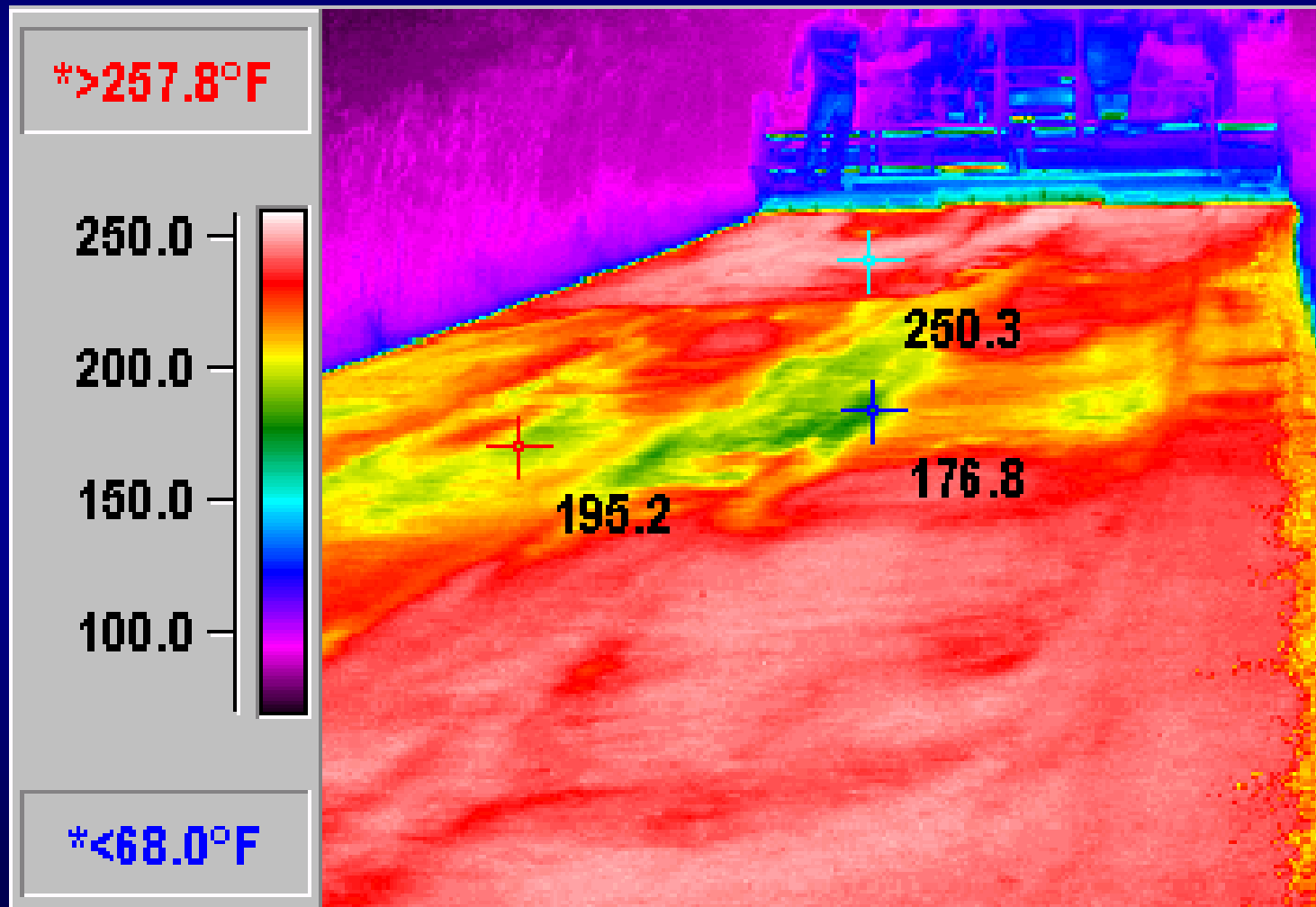






# *Infrared Photo*

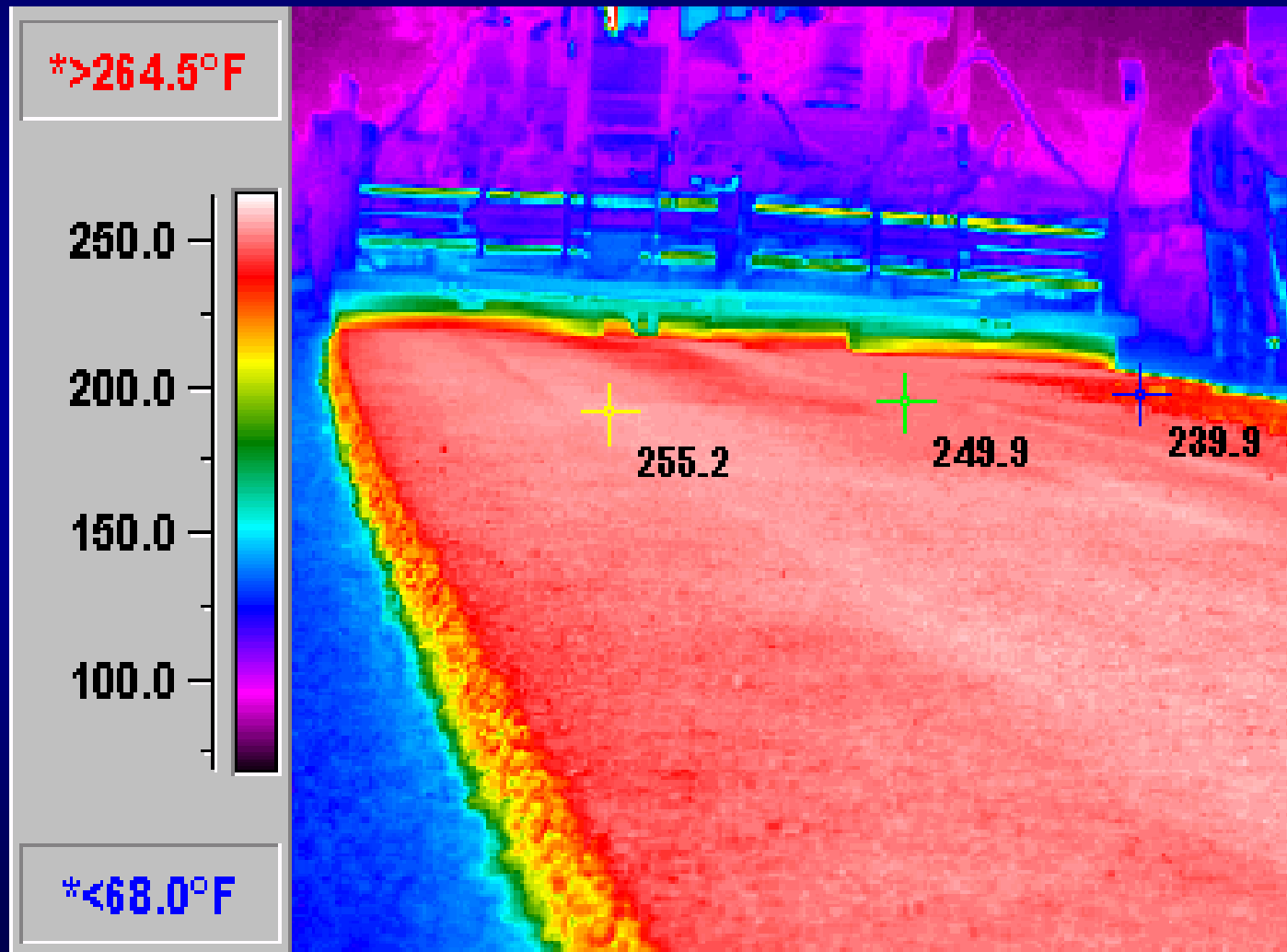
## *(Blaw Knox MTV without Mixing)*



### *3. Cedarapids MS-3 MTV*



# *Infrared Photo (Cedarapids MTV)*



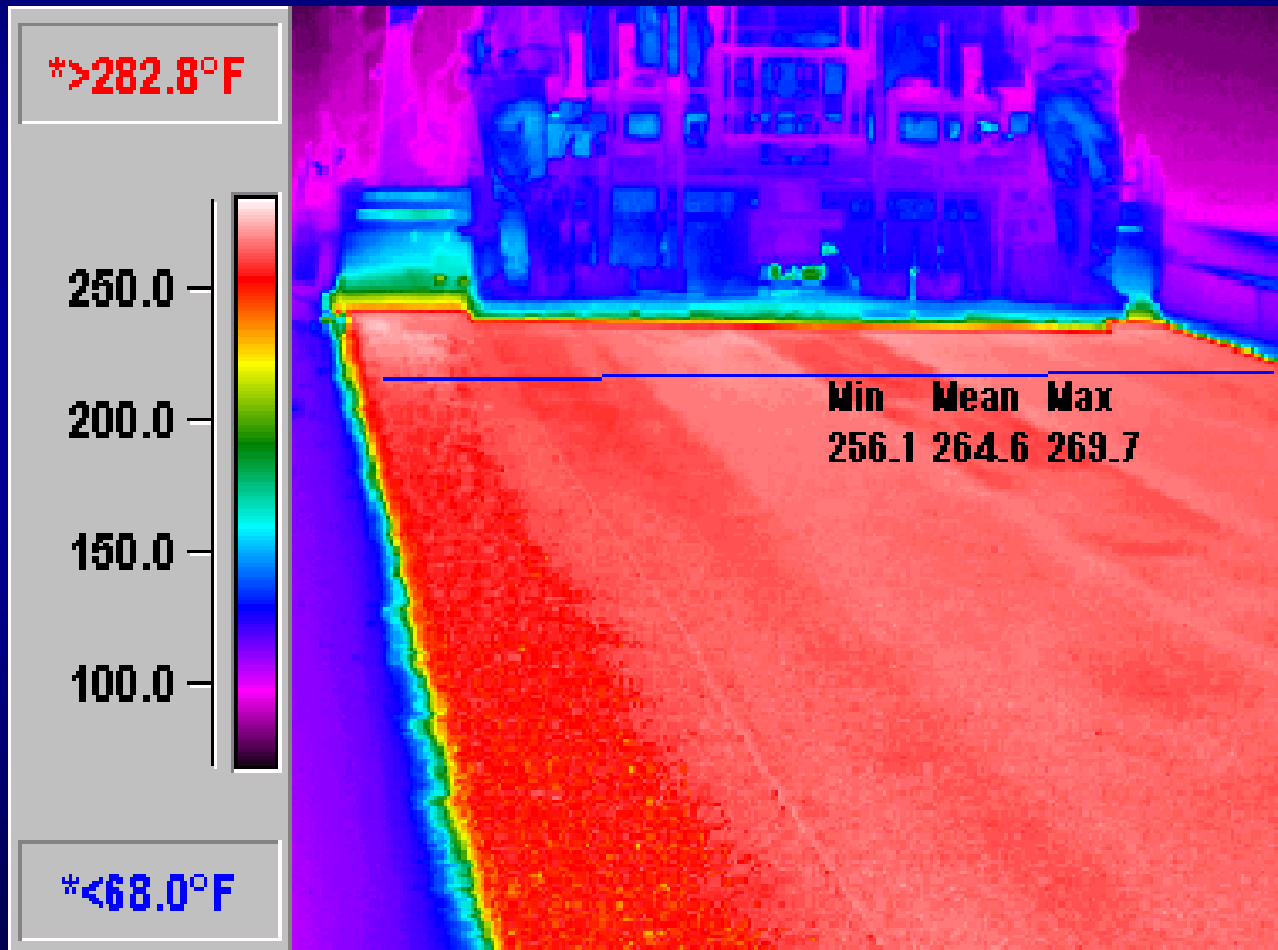
## *4. Roadtec Shuttle Buggy*







# *Infrared Photo (Roadtec Shuttle Buggy)*



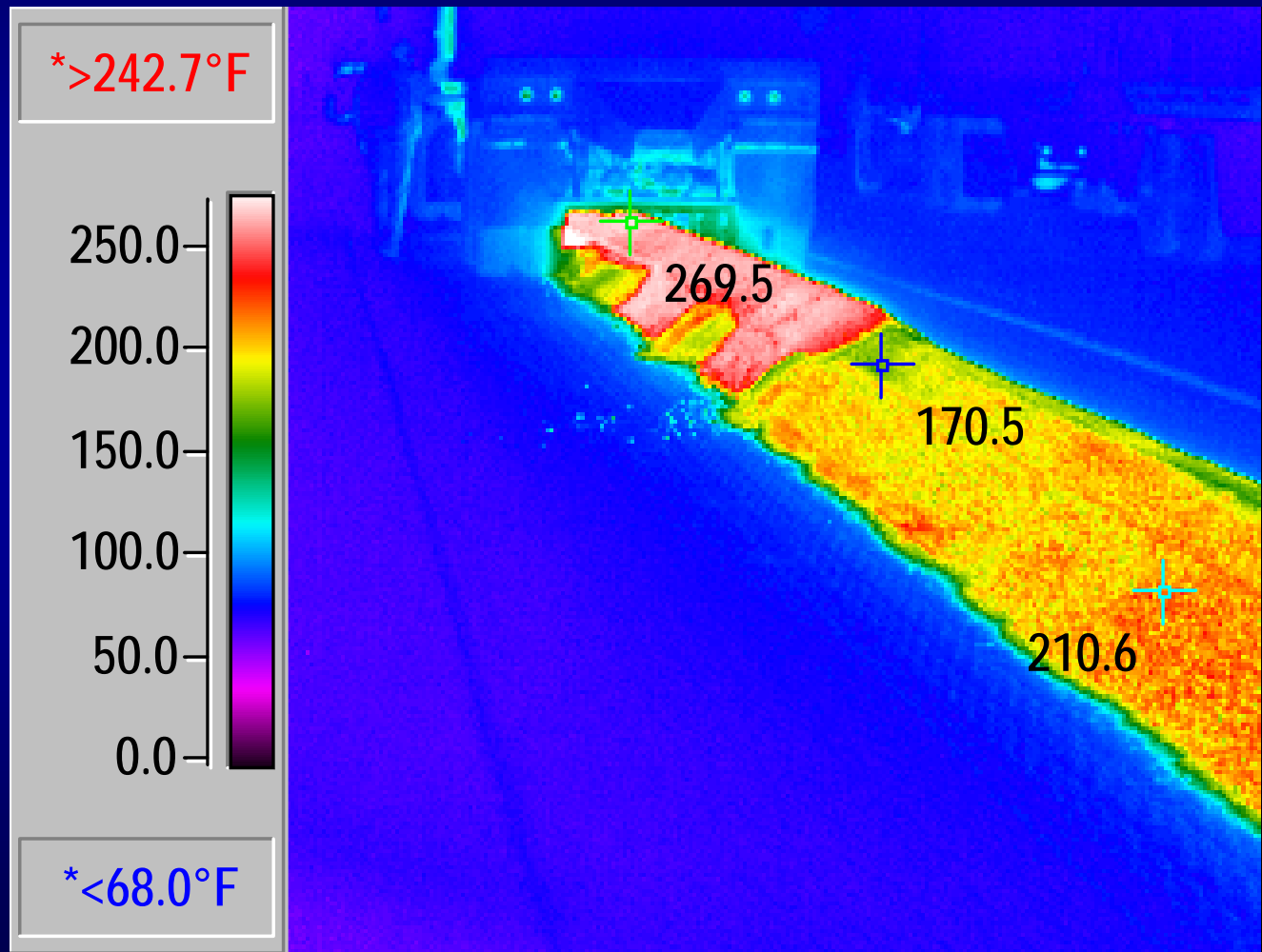
## *5. Lincoln 660-H Windrow Elevator*





# *Infrared Photo*

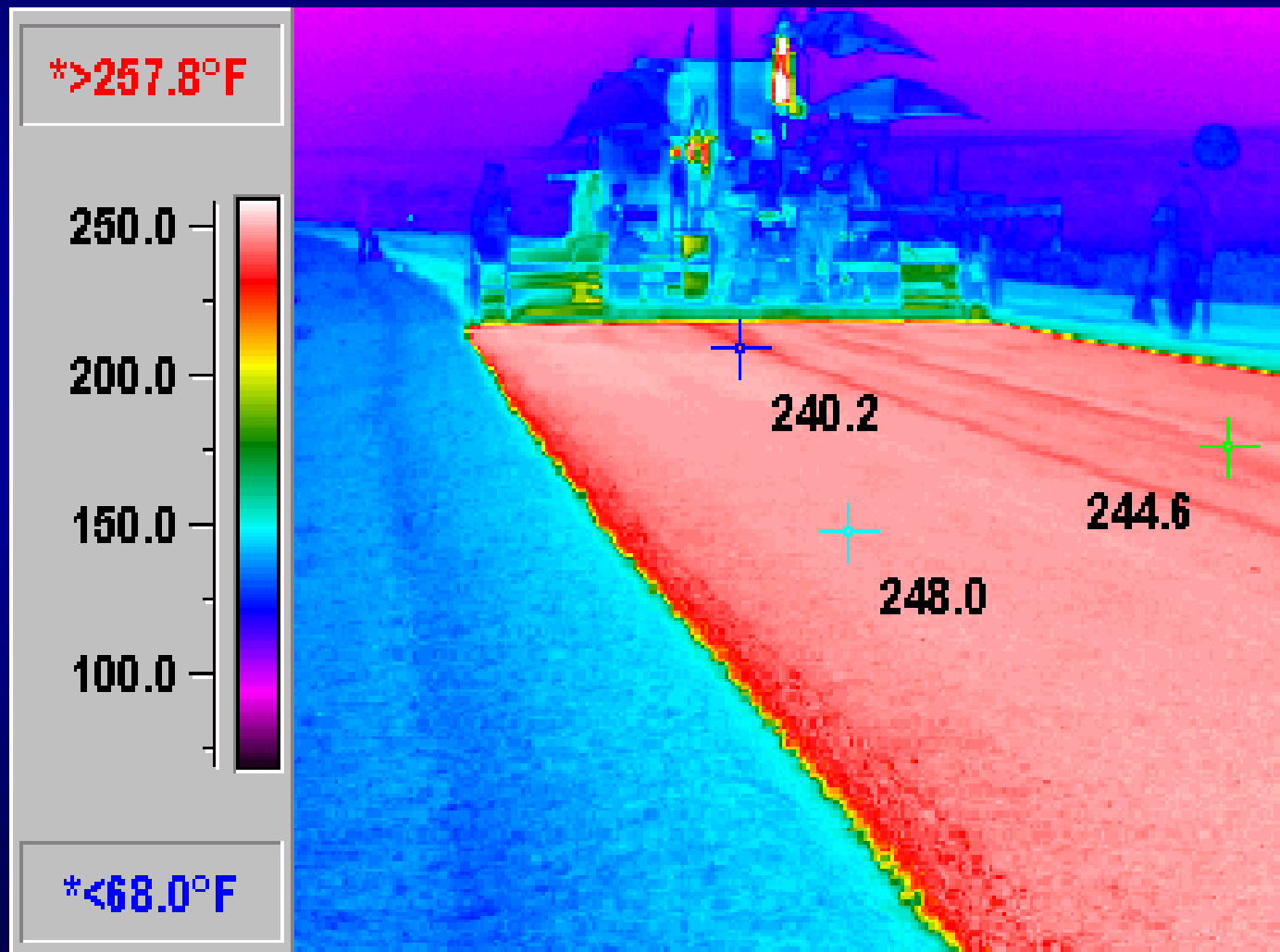
## *(HMA in Front of Windrow Elevator)*





# *Infrared Photo*

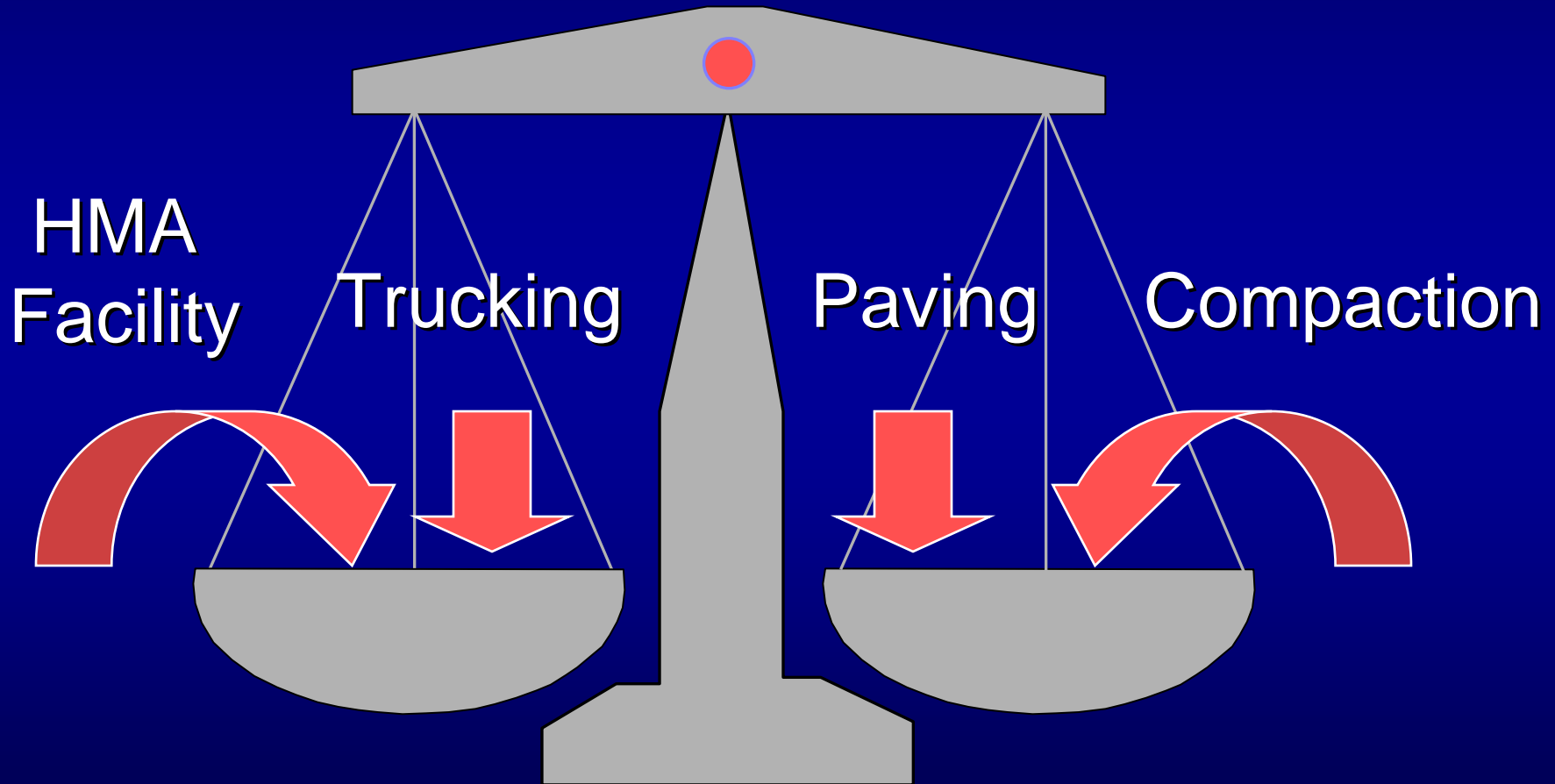
## *(HMA Windrow Behind Paver)*





# *Balancing Production*

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*Questions???*

